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SIGMA XI QUARTERLY

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OFFICERS OF SIGMA XI

President.....	CLARENCE E. MCCLUNG University of Pennsylvania, Philadelphia, Pa.
Secretary.....	HENRY BALDWIN WARD University of Illinois, Urbana, Illinois
Treasurer.....	GEORGE B. PEGRAM Columbia University, New York City

EXECUTIVE COMMITTEE

F. K. RICHTMYER.....	Cornell University, Ithaca, N. Y. <i>Term expires January, 1922</i>
EDWARD ELLERY.....	Union College, Schenectady, N. Y. <i>Term expires January, 1923</i>
LAUDER W. JONES.....	Princeton University, Princeton, N. J. <i>Term expires January, 1924</i>
CARL H EIGENMANN.....	Indiana University, Bloomington, Ind. <i>Term expires January, 1925</i>
GEORGE W. STEWART.....	University of Iowa, Iowa City, Iowa <i>Term expires January, 1926</i>

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SIGMA XI QUARTERLY

EDITORIAL COMMITTEE

Floyd Karker Richtmyer Edwin Emery Slosson
Henry Baldwin Ward

VOL. IX

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CHAPTER OFFICERS

Attention is called to the fact that the list of chapter officers as printed on the inside back cover of each number of the *QUARTERLY* represents the latest official information furnished by the individual chapters. If your chapter is not correctly represented there, please call attention to the fact. The Secretary occasionally receives communications charging him with being two years behind the times because he printed the last list of officers furnished by the chapter. It is of importance for all, both those who are in the Society and those outside of it, that this list should be thoroughly up to date

PRIVILEGES FOR NEW MEMBERS

In the midwinter meetings during Convention week, Sigma Xi has been given a place as an affiliated society in the circle of organizations related to the American Association for the Advancement of Science. This gives a valuable though not generally recognized privilege. Newly elected members of affiliated societies may join the American Association without payment of the usual entrance fee, if they do so before the second October 1 following the date of their election to the Society. The Association sends out special invitations to all new members of affiliated societies, and it is desirable for this purpose, if for no other, that lists of newly elected members be prepared and forwarded promptly to the Secretary's office.

SIGMA XI IN RESEARCH INSTITUTIONS

Especial attention should be called to the new amendment to the Constitution which provides that active chapters of Sigma Xi may be located in research institutions. In the discussions carried on during recent years it developed that the Society as a whole was strongly in favor of this provision. One or two dangers were recognized by various individuals and were taken into consideration in formulating the phraseology of the amendment.

In one case a fear was expressed that such a movement would result in permitting the control of the Society to pass out of the hands of educational institutions and into the hands of those who were less familiar with its history and ideals. Such a condition appears to be highly improbable under the conditions as stated in the amendment. The number of research institutions in the country which by any possibility might acquire relations to Sigma Xi is such a small fraction of the number of educational institutions that no change in control appears likely. As a matter of fact most of the research institutions are controlled by private interests and established for individual purposes so that they could not come into relations with the Society under the terms of the new amendment. There are a few distinguished exceptions to this rule and it would seem appropriate for the Society to recognize their independent character and join them in the encouragement of research and the development of more numerous and larger opportunities for investigation.

If it were true that all the members of these research institutions came from institutions in which Sigma Xi had established chapters, then the need of any such relation between the Society and the research institutions would be less pronounced. Statistics show, however, that the larger part of the staff of such institutions is drawn from colleges where no chapters of Sigma Xi exist. At the Mayo Foundation, where an alumni chapter was recently founded, three quarters of the teaching and investigating staff had never been brought anywhere in contact with Sigma Xi. It is thoroughly in accord with the fundamental principles of this organization that its influence should be felt in every such place in favor of developing pure science and its investigations, and such an influence cannot be exercised if the organization holds itself aloof from such institutions. No one can fail to recognize the large part which

independent research institutions are to play within the near future in the development of knowledge and in the emphasis on research. Shall Sigma Xi hold itself aloof from this movement and be content to let a field go untouched in which it has a natural right to work? The last Convention decided unanimously that it should not.

PROCEEDINGS OF THE TWENTY-FIRST CONVENTION OF THE SOCIETY OF THE SIGMA XI

CHICAGO, ILLINOIS, DECEMBER 30, 1920

The convention of the Sigma Xi Society was called to order in Room 117, Emmons Blaine Hall, University of Chicago, at 2:00 o'clock on Thursday afternoon, December 30. President McClung at once appointed as the committee on credentials F. B. Dains (Kansas) and C. J. Knipp (Illinois), and as the committee on nominations R. C. Osborn (Ohio) and G. A. Baitzell (Yale). Business was temporarily suspended until the committee had collected and passed on the credentials; they then reported as follows:

The undersigned, a Committee on Credentials, certify that the following delegates are present at the Convention meeting on December 30, 1920, duly accredited as representatives of the chapters indicated:

Cornell	Southerland Simpson
Union	Edward Ellery
Kansas	E. B. Stouffer
	G. E. Coghill
	C. F. Nelson
Yale	Henry A. Bumstead
	George A. Baitzell
	Frank L. Cooper
Minnesota	H. A. Erikson
	W. F. G. Swann
Nebraska	Elda R. Walker
Ohio	Charles B. Morrey
Iowa	Robert B. Wylie
Columbia	George B. Pegram
Chicago	Julius Stieglitz
Michigan	H. H. Bartlett
	A. F. Shull
	Peter Okkelberg
Illinois	R. D. Carmichael
	Charles T. Knipp
	H. J. VanCleave
Case	Charles S. Howe
Indiana	Arthur L. Foley

Missouri	W. A. Tarr
Colorado	W. W. Robbins
	Lawrence W. Cole
Northwestern	S. C. Langdon
	Olof Larsell
	E. J. Moulton
Syracuse	George T. Hargitt
Wisconsin	George Wagner
Purdue	Stanley Coulter
	E. G. Mahin
District of Columbia.....	H. L. Shantz
	C. L. Shear
Texas	S. L. Brown
	C. Hartman
	H. J. Ettlinger
North Dakota	B. J. Clawson
Mayo Foundation	E. C. Kendall
	(Signed) F. R. DAINS
	CHAS. T. KNIPP

Other members present who signed the register were:

<i>Name</i>	<i>Location</i>	<i>Chapter</i>
Babcock, E. B.	Berkeley, Cal.	California
Boyd, P. P.	Lexington, Ky.	Cornell
Dains, F. B.	Lawrence, Kan.	Kansas
Diemer, Hugo	Chicago, Ill.	Kansas
Eigenmann, C. H.	Bloomington, Ind.	Indiana
Ellis, Charles A.	Urbana, Ill.	Illinois
Fasten, Nathan	Corvallis, Ore.	Wisconsin
Guberlet, John E.	Stillwater, Okla.	Illinois
Hance, Robert T.	Philadelphia, Pa.	Pennsylvania
Job, Thesle T.	Chicago, Ill.	Iowa
Loveland, G. A.	Lincoln, Neb.	Nebraska
Mann, F. C.	Rochester, Minn.	Mayo Foundation
Richtmyer, F. K.	Ithaca, N. Y.	Cornell
Shadle, Albert R.	Buffalo, N. Y.	Cornell
Stromsten, Frank A.	Iowa City, Iowa	Iowa
Van Cleef, Eugene	Chicago, Ill.	Chicago
Ward, H. B.	Urbana, Ill.	Illinois
Waugh, Karl T.	Berea, Ky.	Chicago
Whitney, D. D.	Lincoln, Neb.	Nebraska

The minutes of the twentieth convention held December 30, 1919, at St. Louis, Missouri, were approved as printed in the QUARTERLY for March, 1920.

The report of the Treasurer was read and on motion a committee consisting of J. F. Kemp (Columbia) and C. P. Berkey (Columbia) was appointed to audit the accounts for the year 1920. It was ordered that the report when audited should be printed in the record of the convention. It appears in full on page 20.

The president reported on the condition of the Society and its outlook in substance as follows:

Owing to my connection with the National Research Council I have been enabled in recent years to visit a considerable number of Sigma Xi chapters. These were ones largely in the Middle Western universities, although occasionally I have been able to go to some of those in the East. At the present time I have thus been able to see sixteen out of the thirty-five chapters. My impression from this experience is that much good can be done by such visitations from the national officers.

It would appear that there is great diversity of purpose and method in the different chapters due to the lack of direct contact between them. I would, therefore, strongly advise that in the future a definite arrangement be made permitting the president and secretary to visit at least once in the two years every chapter of the Society. In this way it would be possible to develop a more unified purpose in the operation of the Society. My impression from these visits is that there is a lack at the present time of any well developed collective aim by the various chapters of the Society. In some places with only one meeting a year the Society functions merely as a scientific honorary society. At others, on the contrary, the organization is the mainspring of all the scientific research activities of the school. In between can be found all variations of these functions.

During the past the Society has accomplished great good in the promotion of research activities in our colleges and universities, but the present offers greatly increased opportunities for carrying forward this aim if only the energies of the organization can be brought in the support of a unified purpose. In this connection we should utilize every agency which will promote such an end.

In addition to the visits of the national officers, connections with organizations having similar purposes will be very advantageous. In this belief I have utilized my connection with the National Research Council to promote an understanding between the two

bodies and to make them mutually helpful. Accordingly the Council has been asked to make the president of Sigma Xi an ex-officio member of its executive board. The plans of the Society to promote research fellowships have in part been carried forward by the National Research Council and an effort to promote a system of research fellowships by the Society will, I am sure, be aided by the Council.

During the year I have sent to the different chapters such publications of the Council as I thought would be of interest to our members. The value of the Sigma Xi in our educational institutions as a means of organizing their research activities has frequently been evidenced by experiences of members of the National Research Council. Whenever they have gone to visit a college or university to carry forward any plans for the promotion of scientific research, almost invariably they have called upon the local chapter of the Society to provide them with the means for addressing the research group of the school. In the nature of the organization of these two bodies they are admirably situated to supplement each other's activities in carrying forward the cause of scientific research. I feel, therefore, that every opportunity should be improved for bringing them together.

One of the pleasantest experiences of the year for me was the visit to the University of North Carolina for the purpose of installing a chapter of Sigma Xi there. I found a small group of most enthusiastic and energetic investigators who were desirous of improving in every way the opportunities for scientific research. I feel sure that the chapter was well placed at this institution and that we shall have from it in the future much good work.

Upon motion the reports from the several chapters were omitted.

The report of the Executive Committee was presented by President McClung, in which it was recommended that the petitioners at the Massachusetts Institute of Technology be granted a charter with the provision that the chapter shall have power to elect undergraduates to associate membership only.

After discussion it was moved to concur in the recommendation and grant such a charter. The roll of the chapters was called by the Secretary and all chapters present and voting supported the motion so that the recommendation was unanimously adopted.

The President then recommended that a charter be granted to petitioners from Iowa State College, Ames, Iowa, with the provision that the chapter shall have power to elect undergraduates to associate membership only. It was moved to concur in the recommendation and grant such a charter. The chapter roll was called by the Secretary and all chapters represented voted in favor of the motion.

The report of the Committee on Sigma Xi Fellowships was presented by the chairman, Edward Ellery (Union). He read a series of replies to circular letters sent to non-active members, almost all of which were very favorable to the idea. Most of the non-active members expressed themselves as anxious to keep in touch with the Society and participate in its work of encouraging research. President McClung, Doctor Stieglitz, and others spoke in favor of the establishment of such fellowships and voiced the opinion that they would prove a source of great strength to the Society and would tend to bring the non-active members into effective relations with the active chapters and strengthen the work of the Society. The Committee was continued.

Certain amendments to the Constitution which were pending were then taken up for consideration. The first item was a recommendation from the Syracuse Chapter which had been approved by the Executive Committee and printed in the *QUARTERLY* for June, 1920 (page 35). The printed record is as follows:

A communication was read from the Syracuse Chapter submitting the following proposed amendment to the Constitution:

"It is recommended that Article VI, Insignia, be amended as follows:

"Section 1a. In the sentence reading 'On the lower line shall be the owner's name, together with the numeral of the class in which he graduated and the name of such college where graduation took place.' Omit everything after, 'On the lower line shall be the owner's name.'"

The communication called attention to the confusion arising from the present form of the requirement. If the section in the Constitution is implicitly observed some members will be called upon to print on the key the name of a college in which no chapter of Sigma Xi exists or which at the time of their graduation did not have a chapter of the society. At the close of the discussion it was voted that the recommendation of the Syracuse Chapter be transmitted to the Convention with the recommendation of the Executive Committee that it be adopted.

It was moved and carried that the amendment be adopted.

The second amendment was one which had been considered at the spring meeting of the Executive Committee and reported with the explanation therefor in the *QUARTERLY* for June, 1920, (page 36) in the following form:

Correspondence from the Missouri Chapter relative to the use of the associate membership badge showed the existence of a distinct misunderstanding with reference to the following statement in the Constitution:

Article VI, Section 1 (b). "The use and granting of such badge shall be optional with the several chapters."

This clause had been interpreted to indicate that the regular badge of the Society might be utilized by a given chapter for its associate members; and inasmuch as the Missouri Chapter was opposed to such use of the regular emblem by associate members they had not provided for the use of any associate membership badge. However, the action taken by the Pittsburgh Convention prohibited distinctly the use of the regular badge for associate members. As a result of the discussion the Missouri Chapter voted unanimously to adopt the new badge and to encourage its use, both as an appropriate insignia and as a means of avoiding confusion. It was on motion voted that the Executive Committee recommend to the Convention to strike out the sentence, "The use and granting of such badge shall be optional with the several chapters."

It was on motion unanimously voted that this amendment to the Constitution be adopted.

The next item considered was another proposed amendment printed in the *QUARTERLY* for June, 1920, (pages 36-37). The Executive Committee voted to recommend that in the sentence, "The monogram may be jewelled, enameled or embossed as desired," in Article VI, Section I, the word *jewelled* be stricken out.

It was moved and carried that this amendment be adopted.

It was reported that the committee appointed to revise and simplify conditions of membership as set forth in Article III of the Constitution had made substantial progress in its work. This Committee which consisted of F. K. Richtmyer (Cornell) and Edward Ellery (Union) had been appointed by the Executive Committee in April (see *QUARTERLY* for June, 1920, page 38) to consider proposals from various chapters concerning the types of membership and obligations of members to the Society. The Committee was continued pending the completion of its report.

The question of Sigma Xi clubs, their representation and organization was then considered. The President stated that some of these

clubs were represented and might well speak for themselves. Remarks from Mr. Eugene Van Cleef formerly of the Duluth Club were asked for. Mr. Van Cleef explained that scientific lonesomeness was the impetus that led to the organization of the club at Duluth. It had only a dozen members but regular meetings were held at which were presented and discussed papers covering various lines of work. Much inspiration was received from these meetings. The importance of keeping the so-called inactive members in touch with the Society of Sigma Xi was emphasized.

A recommendation regarding the representation of these clubs was ready by the Secretary in the form in which it was printed in the minutes of the Executive Committee (*QUARTERLY*, June, 1920, page 40).

The St. Louis Convention requested the Executive Committee to investigate the question of Sigma Xi Clubs and report upon the desirability of such organizations. The Secretary submitted a report showing the number, location and character of such organizations and indicating that one of those recently started was taking preliminary steps towards securing a charter to give the club the full privileges of an active chapter. The discussion brought out the fact that such clubs might naturally be formed in places where no chapter could properly be looked for and where, consequently, no other opportunity to enjoy the privileges of the organization could be secured except through the maintenance of a Sigma Xi Club. It appeared also that in those educational institutions where the granting of a chapter might at first seem doubtful such a club would naturally perform an important function in showing whether the spirit of research was actively and continuously manifested in the institution. Furthermore, by the growth and development of such a group the justification for granting a charter might be thoroughly demonstrated, or on the other hand, by its failure to succeed the wisdom of the step come to appear very doubtful. After this discussion it was voted that the Executive Committee is in sympathy with the organization into clubs of Sigma Xi members, in towns, institutions, or centers of scientific work, believing that they may discharge an important function in disseminating the spirit of investigation and emphasizing the research ideals of the Society. It was further voted that the Executive Committee recommend to the Convention that representatives from such clubs as are duly registered with the Society be given a seat and a voice in the Convention, but no vote.

After extended discussion it was voted that the recommendation of the Executive Committee regarding Sigma Xi clubs be adopted. On motion it was decided that the recommendation be made a part of the By-laws.

The President explained that at this time only one officer was to be elected and called for the report of the Nominating Committee by whom G. W. Stewart (Iowa) was nominated as a member of the Executive Committee, to succeed F. E. Kester (Kansas) whose term expired January 1, 1921. On motion the Secretary was instructed to cast the ballot of the Convention for Mr. Stewart and he was elected a member of the Executive Committee for the term to expire January 1, 1926.

The Secretary read the following communication sent to societies affiliated with the American Association for the Advancement of Science:

"Attention is called to the fact that the 1922 meeting of the American Association and Affiliated and Associated Societies will be held at Toronto, Canada, during the Christmas holidays of 1921, under the auspices of the City of Toronto, the University of Toronto, and the Royal Canadian Institute. This information is given you at this time in order that you may be able to use it in planning for your Society's meetings.

(Signed) BURTON E. LIVINGSTON
Permanent Secretary, A. A. A. S."

Dean Stanley Coulter (Purdue) emphasized the importance of presenting a scientific program at the next meeting. He said in part, "I am in favor of holding the Sigma Xi Convention in Toronto next year. I feel, however, that if we do so we should change the character of our meetings. They should be for scientific inspiration and uplift rather than business sessions concerned with the machinery of the organization. Most of the work done at Sigma Xi Conventions which I have attended could have been very much better done by the Executive Committee. These annual conventions should be made far more significant and this could be accomplished by a carefully prepared program, in which the real spirit of Sigma Xi in research and achievement was brought into the foreground and minor business details put very far in the background. I am eager to have programs at these annual conventions of such value and compelling interest that attendance becomes an opportunity instead of a burden. A meeting such as this today would not impress Canadian Scientists with the high purpose and high value of Sigma Xi."

R. B. Wylie (Iowa) moved that the convention approve meeting at Toronto next year. The motion was adopted.

On vote of George B. Pegram (Columbia) the convention instructed the Executive Committee to arrange for the Toronto meeting. It was voted on motion of Julius Stieglitz (Chicago) that a special program be provided for the Toronto convention to include a stated address at the annual dinner. Messrs. Ellery and Richtmyer were made a special sub-committee on program for the Toronto meeting.

On motion of Edward Ellery (Union) the convention voted that an assessment of seventy-five cents per active member be levied on the chapters for the year 1921.

After various announcements the Convention adjourned to convene at 6:30 p. m. in the Hotel Del Prado for the annual dinner and further business on the program of the day.

The Secretary was greatly indebted to P. Okkelberg (Michigan) for kind assistance in keeping the record of the convention business.

HENRY B. WARD, *Secretary*

THE CONVENTION DINNER

The Society reconvened at 7 P. M. in the private dining-room of the Hotel Del Prado. The arrangements which were admirable in every way had been perfected by a committee of the Chicago Chapter under the leadership of B. C. H. Harvey. The other members of the committee were Harvey B. Lemon, A. W. Slocum and F. M. Nicholson. A list of members and guests present is given as usual. (See page 16.)

At the close of the dinner President C. E. McClung called upon F. R. Moulton (Chicago) who welcomed in behalf of the Chicago Chapter the members and delegates and spoke on the significance of the movement to emphasize and exalt the research ideals of the Society. President McClung in responding referred to the success of the plan, so well worked out by the Chicago Chapter, to introduce associate membership and of its effectiveness in stimulating research among the students in those institutions where it had been tried.

The President then called attention to one proposed amendment to the Constitution which had not yet been acted upon. The Secretary read the record as printed in the QUARTERLY (June, 1920, pages 39-40).

The St. Louis Convention referred to the Executive Committee the question of formulating an amendment to the Constitution which should provide means for placing chapters at institutions devoted to pure research. Since the Convention had suggested that the views of the various chapters be secured on this matter in order to assist the Executive Committee in formulating the plan in detail, a letter was sent out in March to the various chapter secretaries, requesting them to secure and forward the views of their chapter. Extracts from the replies received were read and it seemed to be the consensus of opinion that the plan of granting charters to such institutions would be desirable under proper limitations. After discussion it was voted that the Executive Committee advise the placing of chapters in such research institutions as possess the same unrestricted rights of publication that exist in educational institutions, provided that no institution should be considered unless it shows that its permanency is reasonably assured by private endowment or state support, and recommends that Article II, Section 1 of the Constitution be amended to read as follows (new portion in italics):

"A Chapter may be established at any educational institution in which scientific research work is cultivated and promoted, *or at such research institutions as possess the same unrestricted rights of publication that exist in educational institutions, provided that no institution shall be considered*

unless its permanency is shown to be reasonably assured by private endowment or state support."

On motion it was unanimously voted to amend Article II, Section 1 of the Constitution as recommended by the Executive Committee.

The President then introduced Louis B. Wilson, Director of Pathology, Mayo Clinic, as representative of the Alumni Chapter at the Mayo Foundation for Medical Education and Research who spoke of the significance of the most erudite investigations for advance in the practice of medicine. He referred to researches on the chemistry of iodine, on the physics of radium, and on basal metabolism as carried out at the Foundation. He also spoke of the programs at Sigma Xi meetings of the chapter at the Foundation in which most speakers dealt with topics technically outside of the field of medicine, such as that of Stieglitz on the electron theory and emphasized the value for investigators in medical fields of researches in fundamental sciences.

The next speaker, E. H. Moore (Chicago) was introduced as the newly elected president of the American Association for the Advancement of Science. He paid a glowing tribute to the ideals and work of S. W. Williston, one of the early presidents and leaders in Sigma Xi, and spoke upon the development of science and ideals in the department of mathematics at the University of Chicago.

Ex-president C. S. Howe (Case) was then called upon and discussed the extension of the Society. He maintained that the Society had not adequately advertised and sold the ideas of Sigma Xi. The public knows little of good science and in his opinion Sigma Xi should have regularly a prominent appeal to the public perhaps in the form of a general lecture on the program of the American Association.

G. C. Whipple (Michigan) discussed the rapidly growing competition of special societies and the advantages of broader contacts if effectively maintained.

Edward Ellery (Union) reviewed the replies received from women in response to the appeal from the Fellowship Committee. He pointed out the desirability of encouraging not men or women, but workers, banded together in promotion of Sigma Xi ideals.

Paul Boyd of the University of Kentucky reported on the organization and work of a new Sigma Xi club there, and urged the wider extension of chapter privileges that the ideals of the Society might be more effectively disseminated.

C. W. Shannon of the University of Oklahoma announced that a Sigma Xi club of 17 members had just been organized out there and prophesied good results for the next report.

M. C. Williams (Iowa) mentioned tests used to measure research power in graduate students. In consequence a general discussion was started on the question of proper tests to determine mental possibilities in graduate students, especially of such as will evaluate concretely aptitude for research. The consideration of the value and character of such tests, and of the methods employed, elicited marked general interest and a large number of persons participated in the discussion.

Those present look back upon the occasion as one of the most enjoyable and most valuable ever held under the auspices of Sigma Xi. The thanks of the Society were expressed to the local chapter and especially to the committee of arrangements for its services in arranging so satisfactorily for the needs of the Convention.

* HENRY B. WARD, *Secretary*

ROSTER OF MEMBERS AND GUESTS AT SIGMA XI BANQUET

<i>Name</i>	<i>Chapter</i>	<i>Residence</i>
Baldwin, Bird T.	Iowa	Iowa City, Iowa
Baldwin, Mrs. Bird T.	(Guest)	Iowa City, Iowa
Boyd, Paul P.	Cornell	Lexington, Ky.
Brown, C. F. G.	Chicago	Chicago, Ill.
Brown, S. L.	Texas	Austin, Tex.
Brumback, Florence M.	Chicago	Colorado Springs, Colo.
Buchholz, John T.	Chicago	Fayetteville, Ark.
Carmichael, R. D.	Illinois	Urbana, Ill.
Clo, J. H.	Chicago	Pittsburgh, Pa.
Cobb, Margaret V.	Illinois	Ann Arbor, Mich.
Diemer, Hugo	Kansas	Chicago, Ill.
Doubt, Thos. E.	Chicago	Chicago, Ill.
Ellery, Edward	Union	Schenectady, N. Y.
Ellis, Charles A.	Illinois	Urbana, Ill.
Faris, Ellsworth	Chicago	Chicago, Ill.
Gatewood, Esther L.	Ohio	Pittsburgh, Pa.
Gibbs, R. Clifton	Cornell	Ithaca, N. Y.
Gordon, Edna I.	Michigan	Ann Arbor, Mich.
Green, Wyman R.	Kansas	Chattanooga, Tenn.
Greisheimer, Esther	Chicago	Minneapolis, Minn.
Guernsey, Martha	Michigan	Ogden, Utah
Gurley, W. F. E.	Chicago	Chicago, Ill.
Hargitt, Geo. T.	Syracuse	Syracuse, N. Y.
Harris, W. D.	Nebraska	Chicago, Ill.
Hartman, F. A.	Washington Univ.	Buffalo, N. Y.
Harvey, B. C. H.	Chicago	Chicago, Ill.
Herrick, Ruth	(Guest)	Chicago, Ill.
Howe, Caroline G.	Chicago	Newark, N. J.
Howe, Charles S.	Case	Cleveland, Ohio
Jacobson, Clara	Chicago	Chicago, Ill.
Knight, Rachel	(Guest)	Iowa City, Iowa
Larsell, O.	Northwestern	Evanston, Ill.
Macdonald, S. L.	Colorado	Fort Collins, Colo.
MacMillan, W. D.	Chicago	Chicago, Ill.

McClung, C. E.	Pennsylvania	Philadelphia, Pa.
Moore, E. H.	Chicago	Chicago, Ill.
Moulton, F. R.	Chicago	Chicago, Ill.
Newkirk, Burt L.	Minnesota	Minneapolis, Minn.
Pinney, M. E.	Kansas	Painesville, Ohio
Porter, R. A.	Syracuse	Syracuse, N. Y.
Powers, Frances L.	(Guest)	Evanston, Ill.
Sears, Paul B.	Nebraska	Lincoln, Neb.
Severance, H. M.	Chicago	Chicago, Ill.
Shallenberger, G. D.	Chicago	Beloit, Wis.
Shannon, C. W.	Indiana	Norman, Okla.
Stebbins, Joel	Illinois	Urbana, Ill.
Van Wagenen, M. J.	Minnesota	Minneapolis, Minn.
Vinson, A. E.	Ohio	Tucson, Ariz.
Walker, Elda R.	Nebraska	Lincoln, Neb.
Ward, Henry B.	Illinois	Urbana, Ill.
Weller, Stuart	Chicago	Chicago, Ill.
Whipple, Guy M.	Cornell	Ann Arbor, Mich.
Whitney, David D.	Nebraska	Lincoln, Neb.
Williams, Mabel C.	Iowa	Iowa City, Iowa
Wilson, D. T.	Case	Cleveland, Ohio
Wilson, Louis B.	Mayo Foundation	Rochester, Minn.
Wylie, R. B.	Iowa	Iowa City, Iowa
Yuncker, T. G.	Nebraska	Greencastle, Ind.

MINUTES OF THE EXECUTIVE COMMITTEE MEETING

The Executive Committee of Sigma Xi met in the Quadrangle Club at 11 o'clock Thursday morning, December 31, President McClung in the chair, Messrs. Eigenmann, Ellery, Pegram, Richtmyer and Ward present.

The program of items for the Convention was read and approved. The President discussed informally the extension of the Society.

The Secretary reported that careful investigation had demonstrated the impossibility of copyrighting or protecting in any way the new emblem for associate members.

The Secretary brought up the question of the price of subscription to the *QUARTERLY* on the part of non-active members indicating that the present subscription price did not more than pay the cost of management, much less the total cost. It was accordingly voted that beginning with January 1, 1921, the general subscription price of the *QUARTERLY* be placed at one dollar a year. It was the sense of the Committee that special arrangements should later be made for those who might enter into active relations to the Society in connection with the campaign for Sigma Xi fellowships.

The Secretary called attention to a communication from Doctor B. F. Livingston, Permanent Secretary for the American Association for the Advancement of Science. In this communication Doctor Livingston wrote as follows:

"This letter merely is to bring your attention to the need of a revised membership list for the purposes of the affiliation, and to ask you if it may not be possible for us to have such a list sometime in the near future."

Professor Richtmyer presented informally the plan of the committee appointed to reorganize the membership on a simpler basis. The Committee proposed a plan along the line of the following general outline:

1. Society composed of members and associates.
2. Members or associates classified as resident and non-resident.

Resident: Those residing near enough to a chapter to take part in chapter activities.

Non-resident: Those who reside too far from a chapter to take part in its activities.

(Same for associates)

After extended discussion it was agreed to defer recommendation until the Fellowship Committee had an opportunity to start its work for interesting the Society membership more widely in its work.

Adjourned.

HENRY B. WARD, *Secretary*

REPORT OF THE TREASURER OF SIGMA XI FOR THE YEAR 1920

On January 13, 1920, in accordance with the instructions of the annual Convention of Sigma Xi on December 30, 1919, the Treasurer issued a call to all the chapters for the annual dues of seventy-five cents per active member. The dues of all the chapters except two, the University of Colorado and the District of Columbia, have been paid.

RECEIPTS			
<i>1920</i>	<i>Chapter</i>	<i>Assessment</i>	<i>Amount</i>
Jan. 1	Balance		\$ 27.43
Jan. 2	Advanced by Geo. B. Pegram.....		25.00
Jan. 30	Union College.....1920		11.25
Jan. 30	Union College (7 extra QUARTERLIES).....		3.50
Jan. 30	Worcester1920		24.00
Feb. 7	Kansas1920		73.00
Feb. 11	Missouri1920		44.25
Feb. 11	Wisconsin1919		97.00
Feb. 13	Ohio State.....1920		90.00
Feb. 20	Brown University.....1920		33.00
Feb. 21	Iowa State University.....1920		45.00
Feb. 25	Leland Stanford.....1919		21.50
Feb. 25	Chicago1920		132.00
Feb. 25	California1919		9.50
Mar. 2	Purdue1920		44.25
Mar. 8	Illinois1920		132.00
Mar. 22	Pennsylvania1920		90.00
Mar. 29	Syracuse1920		50.25
Apr. 1	Indiana1920		33.75
Apr. 26	Michigan1919		59.00
Apr. 30	Texas1920		24.00
May 10	Minnesota1920		138.75
May 25	Cornell1920		123.00
May 27	Yale1920		57.75
June 4	Washington University.....1920		38.25
June 21	Advanced by Geo. B. Pegram.....		50.00
June 21	Cash		2.00
July 20	Nebraska1920		45.00
July 21	Columbia (part payment).....1920		40.00
Aug. 3	Advanced by Geo. B. Pegram.....		60.00
Aug. 9	District of Columbia.....1917		3.00
Aug. 9	District of Columbia.....1918		45.00

REPORT OF TREASURER

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Aug. 13	Michigan	1920	123.00
Oct. 4	Northwestern	1920	36.75
Oct. 30	California	1920	28.50
Nov. 5	Rensselaer	1920	23.25
Nov. 15	Case School	1920	13.50
Nov. 15	California	1920	30.00
Nov. 24	Stanford	1920	28.50
Nov. 30	Wisconsin	1920	162.00
Dec. 1	Washington (State)	1920	37.50
Dec. 1	Fellowship		1.00
Dec. 3	District of Columbia.....	1919	48.50
Dec. 3	North Carolina (20 copies of QUARTERLY)....		1.95
Dec. 24	Columbia	1920	30.00
Total Receipts.....			\$2,236.88

DISBURSEMENTS

QUARTERLY, September 1919.....	\$166.07
QUARTERLY, December 1919.....	160.05
QUARTERLY, March 1920.....	211.56
QUARTERLY, June 1920.....	275.00
Mailing List, September and December.....	24.99
Reprints	1.51
Postage for undelivered copies.....	.90
Index to Vol. VII.....	16.15
Designing and engrossing charters (3).....	66.00
Stationery	49.50
Secretary's office assistant.....	669.45
Travel Expenses, Executive Committee.....	365.12
Expenses of President for 1919.....	18.15
George B. Pegram, repaid loan.....	135.00
Expenses of Treasurer's Office.....	5.00
Collection charges.....	1.67
Diplomas	22.75

Total Disbursements\$2,188.87
Cash in bank, December 31, 1920..... 48.01

\$2,236.88

Bills payable, Geo. Banta Publishing Co. \$171.92.
December 31, 1920.

GEO. B. PEGRAM
Treasurer, Sigma Xi Society

We have audited the accounts of the treasurer of the Society of Sigma Xi for the year ending December 31, 1920, and certify that the income shown

by the books of the treasurer has been duly accounted for, that payments have been properly vouched and that the balance sheet and accounts submitted contain a true statement of the financial condition of the Society.

Dated:—March 1, 1921.

JAMES F. KEMP
CHARLES P. BERKEY

AN EFFORT TO DETERMINE HOW SUCCESSFUL ARE SELECTIONS FOR MEMBERSHIP IN SIGMA XI

W. A. TARR

Within the last year the writer, as secretary of the Missouri Chapter of Sigma Xi, had occasion to investigate the membership lists of the chapter from its beginning and while doing so the question occurred to him as to what extent those elected to active membership had borne the fruit which it was thought they showed promise of at the time of their selection. In order to test out his idea the writer compiled two lists, one of all those elected to active membership from the graduate students and the other all those elected from the undergraduates. These lists and the following two questions were sent to all members of the society who were charter members and all others who have been connected with the chapter for several years, with the request that they answer the two questions about all members concerning whom they had any information. Of thirty-five lists sent out, replies were received from twenty-nine, there being at least one from every department represented. It can be said, therefore, that the ground has been very thoroughly canvassed.

The two questions were (1) Engaged in scientific work at present? Yes or No?; and (2) Any papers published and if so how many? In the great majority of instances the information was given in the concise form asked for, but when such was not the case, if the writer was unable to determine definitely he did not include that individual.

The Missouri Chapter was founded in 1905. They elected to active membership from the undergraduates up to and including 1914, but ceased to do so with that year. Associate members are elected at present, but such members have not been counted in this study. The table printed at the top of the following page shows the number elected up to and including 1920:

	Undergraduates	Graduates	Total	Percent
Number elected	105	107	212	100
Deceased	6	4	10	4.5
Total living	99	103	202	95.5
No report	24	8	32	15
Considered in this study	75	95	170	85

The following table shows the number of those about whom information was available who are engaged in scientific work.

	Undergraduates	Graduates
Total considered in this study.....	75	95
Engaged in scientific work.....	56	80
Not engaged in scientific work.....	19	15
Percent engaged in scientific work.....	74.6	88.8

This table shows that 14.2% more graduates are now actively engaged in scientific work than undergraduates.

On the other hand the results as shown by publishing are strikingly reversed as the following table shows.

	Undergraduates	Graduates
Number who have published one or more papers.....	45	46
Percentage who have published one or more papers.....	80.4	57.5
Not engaged in scientific work but have published.....	4	3
Total number of publishing.....	49	49

Just what explanation can be given of these figures is a question. Altho a smaller percentage of those elected as undergraduates have gone into scientific work, those so engaged have been very energetic in publishing their results.

In this connection it is of interest to compare the graduates elected up to 1914, and the undergraduates elected during this interval.

	Undergraduates	Graduates
Elected from 1905-14.....	105	53
Engaged in scientific work.....	56	37
Number publishing.....	45	26
Percent publishing.....	80.4	70.3

The table shows that the majority of all papers by the graduate group were published by those elected during the earlier period, just as one would expect, since they have been out longer.

The undergraduate electives of the same period were more productive, 80.4% of those engaged in scientific work publishing and 70.3% of the graduates publishing. On this basis, more of the selections made from the undergraduate group have lived up to their promise than from the graduates.

In order to learn to what extent all those elected have been well selected, the following table was made.

	Undergraduates	Graduates
Percent of all elected engaged in scientific work.....	53.3	75
Percent of all elected who have published.....	47	44
Percent of all elected who have published and on whom we have reports.....	65.3	51.5

Only 53.3 percent of the undergraduates, as far as is known, have gone into scientific work and 47 percent have published. While one would expect fewer undergraduates on the average, to go into scientific work, the percentage publishing is higher than that of the graduate group, which is not to be expected and probably would not be the case as a rule. The number of graduates publishing is lower than expected.

What has been the result of all elections in both classes? The following table shows at a glance the results in the Missouri Chapter.

	Percent
Total number elected.....	212
Deceased	10
No information.....	32
Reports on	180
Number of those reported who are engaged in scientific work.....	136
Percent in scientific work of total elected.....	64.1
Number of those engaged in scientific work who have published.....	91
Number publishing of all elected.....	98

Considering all who have been elected, 64.1 percent are engaged in scientific work. Of those reported upon 75.5 percent are so engaged and 67 percent of these have published. The percent of those publishing, when all elections are considered is much less, 46 percent.

If all those about whom we have no information be counted as not being engaged in scientific work, which is probably largely the

case, but not absolutely so, the Missouri Chapter has been 64.1 percent correct in its elections assuming that all elected would have gone into scientific work, an assumption which is probably not warranted, but with higher standards for election, this should become more generally true. Are our standards any higher at present than they were ten years ago? Personally, the writer does not believe that the standards for election have been raised in recent years, but one cannot help voicing the sentiment expressed by former President Stieglitz in a recent number of the *QUARTERLY* in regard to the selection of associate membership and, in a stronger degree, that of the active membership.

It is evident that the members who came from the undergraduates have not been the main cause for only 75 percent of those elected going into scientific work. Neither can it be said that the graduate list includes those so recently elected that as yet they have not gone into their work, because it is probably true that the character of the work of the more recent men is better known to the active membership and that they have been reported upon more fully.

Taking only known cases, it is evident that our selections have not been made with sufficient care. One wonders to what extent this is true of other chapters. Allowing for the numerous possible errors, the study points out a vital weakness in our method of election. By applying more rigidly the standards for election to associate members and causing all or a majority of our members to pass thru this class before final election, we will safeguard our standards.

CHAPTER REPORTS

THE KANSAS CHAPTER

During the academic year 1919-1920 the Chapter held five regular meetings for the discussion of scientific papers and business, the annual banquet, and in place of the regular March meeting sponsored two public lectures.

The scientific programs were as follows:

October 16, 1919. Medical Research in the Air Service, by Professor F. C. Dockeray.

November 20, 1919. The Airplane, by Professor S. Lefschetz and Lieutenant Burnette Bower.

December 18, 1919. Studies on Influenza, by Professor N. P. Sherwood.

January 15, 1920. The North American Beaver and Its Ways, by Professor C. E. Johnson.

March 25, 1920. The Foundation of Chemical Development; and Positive and Negative Valence, by Professor W. A. Noyes of the University of Illinois. These two lectures were open to the public.

May 26, 1920. The Mystery of Embryonic Development and Bodily Growth, by Professor B. M. Allen.

The following named persons were elected to active membership:

FACULTY

CHARLES ARTHUR HASKINS, B.S., C.E.

Sanitary Engineer

Engineering Bulletin No. 5. Water Supplies of Kansas. Engineering Bulletin No. 2. Sewage Disposal in Kansas. Report on the Water Supplies, Sewage and Garbage Disposal at the Military Camps, to be published by the War Department.

HANDEL T. MARTIN

Paleontology

Some New Features in Uintacrinus. South American Archeological Notes. Further Notes on the Pueblo Ruins of Scott County, Kansas. On a Comparison of Three Skulls: *Casteroides ohionensis*, *Casteroides kansensis*, and *Castor*. Notice of a New Fish from the Permian of Kansas with Description. Kansas Univ. Sci. Bull. A Collecting Trip to Patagonia, South America. (Trans. Kan. Acad. of Sci. 19:101-104.)

case, but not absolutely so, the Missouri Chapter has been 64.1 per cent correct in its elections assuming that all elected would have gone into scientific work, an assumption which is probably not warranted, but with higher standards for election, this should become more generally true. Are our standards any higher at present than they were ten years ago? Personally, the writer does not believe that the standards for election have been raised in recent years, but one cannot help voicing the sentiment expressed by former President Stieglitz in a recent number of the *QUARTERLY* in regard to the selection of associate membership and, in a stronger degree, that of the active membership.

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Sanitary Engineer

Engineering Bulletin No. 5. Water Supplies of Kansas. Engineering Bulletin No. 2. Sewage Disposal in Kansas. Report on the Water Supplies, Sewage and Garbage Disposal at the Military Camps, to be published by the War Department.

HANDEL T. MARTIN

Paleontology

Some New Features in Uintacrinus. South American Archeological Notes. Further Notes on the Pueblo Ruins of Scott County, Kansas. On a Comparison of Three Skulls: *Casteroides ohionensis*, *Casteroides kansensis*, and *Castor*. Notice of a New Fish from the Permian of Kansas with Description. Kansas Univ. Sci. Bull. A Collecting Trip to Patagonia, South America. (Trans. Kan. Acad. of Sci. 19:101-104.)

HUBERT SHEPPARD, Ph.D.

Anatomy

The Correlation of Structure and Function in the Development of the Eye. (Jour. Comp. Neurol.) Foveal Adaptation to Color. (Amer. Jour. Psych.) Hermaphroditism in Man. (Anat. Rec.)

GRADUATES

EMILY V. BERGER

Chemistry

The Solubility of Helium in Water (thesis for A.M.).

ETHEL MAY KINNEY

Bio-Chemistry

Effect of Temperature Upon Toxicity of Thyroid. (Amer. Jour. Physiol. June, 1919.) Estimation of Kidney Function by Quantitative Analysis of Products of Metabolism Over Short Periods of Time (thesis for A.M.).

UNDERGRADUATES

OAKLAND MAUPIN

Psychology

Effect of Wood Alcohol Fumes on the Brightness Vision of the White Rat.

JAY JOHN JAKOWSKY

Engineering

Methods Used for Recovering Casing Head Gasoline (Kansas Eng.). Article on Oil Shales, ready for publication. The Construction and Operation of a Small Still for Separating Oil from Shale and refining Same (thesis for B.S.).

ALUMNI

FRANK C. GEPHART

Chemistry

Report of a Dietary Study of St. Paul's School, Concord, New Hampshire. (Bost. Med. Surg. Jour., Jan. 4, 1917.) Compact Accurate Buret for Use in Nitrogen Work. (C. Abst., 7:2873.) Fat in Feces. (Jour. Biol. Chem., 19:521.) Clinical Thermometry. (Arch. Inst. Med., 15:753.) Determination of Basal Metabolism of Normal Men, and the Effect of Food.

C. M. STERLING, *Secretary*

CHAPTER OFFICERS

LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS

CHAPTER	PRESIDENT	VICE-PRESIDENT	SECRETARY	TREASURER
Cornell.....	S. Simpson....	T. R. Briggs...	A. H. Wright..	O. A. Johannsen
Rensselaer...	M. A. Hunter...	R. B. Bourne..	E. M. Clark...	W. J. Williams
Union.....	Ernst J. Berg...	Morland King..	M. F. Sayre...	M. F. Sayre
Kansas.....	F. E. Kester....	G. E. Coghill..	C. M. Sterling.	H. E. Jordan
Yale.....	H. G. Barbour..	G. A. Baitsell..	R. H. Suttie...	F. L. Cooper
Minnesota...	R. E. Scammon..	R. A. Gortner..	A. T. Henrici..	F. K. Butters
Nebraska....	D. D. Whitney..	Leunis Van Es..	E. N. Anderson	M. G. Gaba
Ohio.....	R. C. Osburn...	H. C. Sampson.	M. Hollingsworth.....	T. G. Phillips
Pennsylvania	M. J. Babb....	O. L. Shinn....	H. C. Barker..	H. S. Colton
Brown.....	P. H. Mitchell..	R. F. Chambers	T. H. Brown...	C. H. Currier
Iowa.....	Arthur H. Ford.	Henry L. Rietz.	F. A. Stromsten	L. P. Sieg
Stanford...	D. Campbell...	A. F. Rogers...	W. F. Dietrich.	W. F. Dietrich
California...	G. N. Lewis....	Frank Daniel..	D. R. Hoagland	A. C. Alvarez
Columbia....	J. K. Finch....	W. I. Slichter..	Harold A. Fales	Harold A. Fales
Chicago.....	F. R. Moulton..	R. D. Salisbury	C. H. Swift....	C. H. Swift
Michigan....	John C. Parker.	A. F. Shull....	P. O. Okkelberg	A. J. Decker
Illinois.....	H. F. Moore....	J. A. Detlefsen.	H. J. Van Cleave	B. S. Hopkins
Case.....	W. R. Veasey...	C. D. Hodgeman	R. C. Hummel..	T. M. Focke
Indiana.....	Will Scott....	M. E. Hufford..	C. A. Malott...	C. E. Edmonson
Missouri....	C. W. Greene...	R. H. Baker....	W. A. Tarr....	O. R. Johnson
Colorado....	F. Ramaley....	L. W. Cole....	Paul M. Dean...	F. S. Bauer
Northwestern	U. S. Grant....	A. D. Black....	E. J. Moulton..	L. W. Webb
Syracuse....	O. W. H. Mitchell.....	C. C. Adams....	L. C. Petry....	H. F. A. Meier
Wisconsin...	M. F. Guyer...	O. L. Kowalke.	G. W. Keitt....	F. C. Krauskopf
University of				
Washington.	E. Victor Smith	S. H. Anderson.	A. F. Carpenter	T. G. Thompson
Worcester...	A. W. Duff....	H. P. Fairfield..	J. B. Zinn.....	A. J. Knight
Purdue.....	E. G. Mahin...	C. G. Woodbury	G. A. Young...	D. D. Ewing
Washington				
University...	J. Erlanger...	J. M. Greenman	T. R. Ball.....	H. C. Hake
District of				
Columbia...	Paul Bartsch..	J. Warren Smith	W. R. Maxon...	C. A. Briggs
Texas.....	S. L. Brown...	W. A. Felsing..	G. P. Horton...	H. J. Ettlinger
Mayo Founda-				
tion.....	A. H. Sanford..	E. C. Kendall..	A. W. Adson...	A. W. Adson
North Caro-				
lina.....	J. H. Pratt....	J. M. Bell....
North Dako-				
ta.....	R. T. Young...	B. J. Spence...	B. J. Clawson..	B. J. Clawson

Offices of Recording and Corresponding Secretary combined according to advice of Convention with the exception of Yale and Texas in which chapters only the Corresponding Secretary is listed.

List corrected up to March 1, 1921.

OFFICIAL ANNOUNCEMENTS

Associate membership emblems can be secured only by order from the chapter secretary to the national secretary. All orders must be prepaid. Special order blanks sent on request.

SIGMA XI PUBLICATIONS

QUARTER CENTURY RECORD AND HISTORY bound in electric blue cloth. 1886-1911. 7,500 names. 550 pp. \$2.50.

QUARTERLY, Volumes 1-7, 1913-19, four numbers each, unbound, 50 cents per each volume. Forwarded prepaid on receipt of draft or money order in payment of the amount indicated.

Title page and Table of Contents of any volume on request.

Those ordering a complete set of the QUARTERLY and HISTORY will receive in addition until the supply is exhausted without extra cost a copy of each of the Proceedings of the early Conventions as follows:

Seventh (Philadelphia) Convention. 1904. Pamphlet. 15 pp.

Eighth (New York) Convention. 1906. Pamphlet. 7 pp.

Ninth (Chicago) Convention. 1908. Pamphlet. 14 pp.

Tenth (Baltimore) Convention. 1909. Pamphlet. 6 pp.

Eleventh (Boston) Convention. 1909. Pamphlet. 16 pp.

Twelfth (Minneapolis) Convention. 1910. Pamphlet. 27 pp.

Thirteenth (Washington) Convention. 1911. Pamphlet. 27 pp.

Later conventions are reported in the QUARTERLY.

PRINTED BLANKS

The General Convention has instructed the Secretary to forward to chapters under the following stipulations:

Membership Certificates, stamped with the great seal of the Society. In packages of fifty prepaid, on advance payment of \$2.50 each package. Please specify carefully whether for regular or associate members.

Index Cards, provided a duplicate set be sent for the general index of the Society maintained in the secretary's office. Gratis.

Statistical Record Blanks, for sending annual reports giving chapter officers, elections, and other statistical data. Gratis.

MAILING LISTS FOR THE QUARTERLY

Chapter secretaries are requested to furnish a correct list of mailing addresses of active members for the printer. Blank forms. Gratis on demand.

The mailing list should be sent early in September and be valid for the academic year. All changes of address and all other correspondence should be addressed to the Secretary of Sigma Xi, Henry B. Ward, Urbana, Illinois.